WHAT IS CLAIMED IS:

1. An electromagnetic actuator having a coil on which current is impressed, a magnet that forms a magnetic circuit between its poles across a magnetic gap with a magnet yoke, a diaphragm that vibrates by magnetic action when a high-frequency current is impressed and a vibration plate that vibrates by magnetic action when a low-frequency current is impressed, with the coil positioned within the magnetic gap and the parts thereof being accommodated in a basket, in which the magnet is radially arrayed and positioned with its north and south poles parallel to the diaphragm and the vibration plate.

2. An electromagnetic actuator as described in claim 1 above, in which there are two vibration plates with the magnet between them, the two vibration plates providing a double-suspension structure.

3. An electromagnetic actuator as described in claim 1 or 2 above, in which the cover of the basket is used as magnetic shielding.

4. An electromagnetic actuator having a coil on which current is impressed, a magnet that forms a magnetic circuit between its poles across a magnetic gap with a magnet yoke, a diaphragm that vibrates by magnetic action when a high-frequency current is impressed and a vibration plate that vibrates by magnetic action when a low-frequency current is impressed, with the coil positioned within the magnetic gap and the parts thereof being accommodated in a basket, in which the vibration plates are made of a stainless steel or alloy of copper and titanium that does not require an aging/hardening process after being formed.

5. An electromagnetic actuator having a coil on which current is impressed, a magnet that forms a magnetic circuit between its poles across a magnetic gap with a magnet yoke, a diaphragm that vibrates by magnetic action

when a high-frequency current is impressed and a vibration plate that vibrates by magnetic action when a low-frequency current is impressed, with the coil positioned within the magnetic gap and the parts thereof being accommodated in a basket, in which the basket has a thin bottom plate that also serves as a vibration plate.

6. An electromagnetic actuator as described in claim 5 above, in which the basket has a thin bottom plate with at least one lip that is concentric with the plate.

7. An electromagnetic actuator as described in claim 5 or 6 above, in which the basket has a thin bottom plate formed of a material chosen from among polyethylene terephthalate (PET), polyethyl imide (PEI) or polyimide (PI).

8. An electromagnetic actuator having a coil on which current is impressed, a magnet that forms a magnetic circuit between its poles across a magnetic gap with a magnet yoke, a diaphragm that vibrates by magnetic action when a high-frequency current is impressed and a vibration plate that vibrates by magnetic action when a low-frequency current is impressed, with the coil positioned within the magnetic gap and the parts thereof being accommodated in a basket, in which the vibration plate is supported within the basket by an elastic piece that presses against the surface of the outer rim of the vibration plate.

9. An electromagnetic actuator as described in claim 8 above, in which the magnet yoke is supported by the vibration plate and the elastic piece has an inward protrusion that is positioned close to the outer edge of the magnet yoke.

10. An electromagnetic actuator having a coil on which current is impressed, a magnet that forms a magnetic circuit between its poles across a magnetic gap with a magnet yoke, a diaphragm that vibrates by magnetic action when a high-frequency current is impressed and a vibration plate that vibrates by

magnetic action when a low-frequency current is impressed, with the coil positioned within the magnetic gap and the parts thereof being accommodated in a basket, in which the coil is supported by a concentric projection that projects from the surface of the vibrating portion, and there is a diaphragm within the basket.

11. An electromagnetic actuator having a coil on which current is impressed, a magnet that forms a magnetic circuit between its poles across a magnetic gap with a magnet yoke, a diaphragm that vibrates by magnetic action when a high-frequency current is impressed and a vibration plate that vibrates by magnetic action when a low-frequency current is impressed, with the coil positioned within the magnetic gap and the parts thereof being accommodated in a basket, in which the coil is supported by a concentric projection that projects from the diaphragm, and the coil and diaphragm are assembled in a single unit.

12. An electromagnetic actuator having a coil on which current is impressed, a magnet that forms a magnetic circuit between its poles across a magnetic gap with a magnet yoke, a diaphragm that vibrates by magnetic action when a high-frequency current is impressed and a vibration plate that vibrates by magnetic action when a low-frequency current is impressed, with the coil positioned within the magnetic gap and the parts thereof being accommodated in a basket, in which the magnet is held in a magnet yoke and the magnet yoke holding the magnet is supported by the surface of the vibration plate, and the magnet, magnet yoke and vibration plate are assembled in a single unit.

13. An electromagnetic actuator mounting structure for mounting an electromagnetic actuator inside portable electronic equipment in which elastic packing is sandwiched between the inner surface of the equipment case and the basket of the electromagnetic actuator and between the basket of the electromagnetic actuator and the electromagnetic actuator mounting substrate, so that the electromagnetic actuator is mounted inside the portable electronic equipment.

14. An electromagnetic actuator mounting structure as described in claim 13 above, in which the elastic packing is fitted to the bottom of the basket, and is sandwiched between the basket of the electromagnetic actuator and the mounting substrate.